An INL researcher performs checks on an advanced casting furnace recently installed in the Analytical Laboratory's Casting Lab glovebox.

Analytical Laboratory

The Analytical Laboratory at Idaho National Laboratory's Materials and Fuels Complex provides the chemical, radiochemical, physical and other analytical data needed for research and engineering development. These activities support various INL research programs including advanced nuclear fuel design, waste management and environmental science. A large percentage of INL research requires many of the Analytical Lab's capabilities.

The lab was originally constructed in the late 1950s to provide analytical support for the Experimental Breeder Reactor II program. The facility was expanded in 1970 with the addition of a wing dedicated to sodium chemistry, and again in 1977 with the addition of a second wing to house a laboratory for mass spectrometry measurements and a laboratory for nondestructive assay measurements.

The Analytical Lab receives a wide variety of samples from across INL as well as from other non-INL entities such as private companies and

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The Radiological Mass Separator in MFC's Analytical Lab provides a unique capability for creating isotopically pure samples to support research activities.

The Energy of Innovation

Idaho National Laboratory

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other federal agencies. Sample types include those needed for research and development, material accountability, radiation monitoring, process monitoring and environmental monitoring. The Analytical Lab also supports engineering development activities, such as the preparation of samples for irradiation testing.

The main features and equipment in the lab's A wing include six interconnected hot cells, gloveboxes, a chemistry laboratory, a 5-ton overhead bridge crane and a loading dock. The main features of the B wing include general chemistry, state-of-the-art analytical instruments and laboratories, inert-atmosphere gloveboxes, fume hoods, counting rooms, and assay equipment. The Analytical Lab houses a wide variety of analytical instrumentation and equipment typical of a standard chemistry laboratory, including various mass spectrometers, furnaces, X-ray diffractometers and equipment to test fundamental physical properties. The Analytical Lab also hosts several unique fuel fabrication capabilities in the Metal Reactor Fuel Casting Lab, including the INL-designed Glovebox Advanced Casting System (GACS) furnace. This furnace gives INL a world-leading capability to cast metallic fuel samples containing transuranic elements with greater efficiency and less waste than previous designs.

The A wing basement houses two suspect liquid waste collection tanks, cask handling/loading equipment and ventilation equipment. The B wing basement houses analytical equipment, including a mass separator and spectrometry equipment, and a counting room.

MFC employees coordinate activities during maintenance of one of the Analytical Lab's hot cells.

An MFC technician works at the Analytical Lab's new wet prep glovebox in the lab's B wing.

Key Capabilities

- Analysis and characterization of as-built and post-irradiated nuclear fuels and reactor components
- Analysis of hazardous, mixed, or highly radioactive wastes, other waste forms, and samples
- Analytical chemistry support for nuclear forensics
- Determinations of inorganic isotopic content constituents and radionuclides
- Radioisotope separation
- Characterization of engineered materials
- Expertise in characterization of engineered materials and the nuclear fuel life cycle

For more information

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